
FULL TEXT OF CASES (USPQ FIRST SERIES)
In re SEBEK, 175 USPQ 93 (CCPA 1972)

In re SEBEK

(CCPA)

175 USPQ 93

Decided Aug. 31, 1972

No. 8631

U.S. Court of Customs and Patent Appeals

Headnotes

PATENTS

1. Evidence — Expert testimony (§ 36.10)

Opinions of experts in the field, as contained in their publication, that values greater than five per cent would not be expected to be advantageous are entitled to consideration on question of obviousness.

2. Patentability — Composition of matter (§ 51.30)

While it may ordinarily be the case that determination of optimum values for parameters of a prior art process would be at least prima facie obvious, that conclusion depends upon what prior art discloses with respect to those parameters; where prior art disclosure suggests outer limits of range of suitable values, and that the optimum resides within that range, and where there are indications elsewhere that in fact the optimum should be sought within that range, the determination of optimum values outside that range may not be obvious; in area of technology shown to be highly unpredictable in process values, discovery of optimum values not in any way suggested by prior art is more likely to be unobvious than obvious within meaning of 35 U.S.C. 103.

Particular patents—Beta-Carotene

Sebek, Method for Producing Beta-Carotene, claims 1 to 3 of application allowed.

Case History and Disposition:

Page 93

Appeal from Board of Appeals of the Patent Office.

Application for patent of Oldrich K. Sebek, Serial No. 339,331, filed Jan. 22, 1964; Patent Office Group 170. From decision rejecting claims 1 to 3, applicant appeals. Reversed.

Attorneys:

ROMAN SALIWANCHIK (JOHN KEKICH of counsel) both of Kalamazoo, Mich., for appellant.

S. WM. COCHRAN (JACK E. ARMORE of counsel) for Commissioner of Patents.

Judge:

Before WORLEY, Chief Judge, and RICH, ALMOND, BALDWIN, and LANE, Associate Judges.

Opinion Text

Opinion By:

LANE, Judge.

This appeal is from the decision of the Board of Appeals sustaining the examiner's rejection of claims 1-3 of appellant's application ¹on the ground of obviousness (35 U.S.C. 103) over certain prior art. We reverse.

The invention is in the field of chemical synthesis of beta-carotene, a precursor of vitamin A. It had previously been known that beta-carotene could be produced by certain micro-organisms using an aqueous fermentation medium containing citrus molasses, a product obtained from whole citrus peel. Appellant contends that in the prior art processes, the level of citrus molasses was kept at or below 5% by weight of the fermentation medium in the belief that there was no benefit to be gained from the addition of greater quantities. It is asserted that the present invention is based on the discovery that at citrus molasses levels of at least 7-1/2%, the yield of beta-carotene is greatly and unexpectedly increased. In his specification, appellant reports the following data:

Table set at this point is not available. See table in hard copy or call BNA PLUS at 1-800-452-7773 or 202-452-4323.

Appellant does not argue claims 1-3 individually, and claim 1, therefore, adequately defines the subject matter involved in this appeal. Claim 1 reads as follows:

In a method for microbiologically producing b-carotene in a submerged aerobic fermentation using [the micro-organism] *Blakeslea trispora*, the improvement which comprises incorporating at least about 7-1/2 per cent of citrus molasses in a b-carotene fermentation medium.

The examiner rejected claims 1-3 under 35

Page 94

U.S.C. 103 as unpatentable (1) Ciegler et al. ²(hereinafter the Ciegler patent) in view of Hoffmann et al. ³(Hoffmann) and (2) Fulde ⁴alone or in view of the Ciegler patent. The Ciegler patent discloses the use of both citrus meal and citrus molasses in the fermentation medium, which is the same medium as that utilized by appellant, to increase the yield of beta-carotene. Tables I and II of the patent report the beta-carotene yields using citrus meal and citrus molasses respectively.

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The Ciegler patent does not disclose the use of any level of citrus molasses greater than 5% by weight, although there is no express disclosure to the effect that such greater proportions could not be used.

Hoffmann is drawn to the production of vitamin B12 using a microorganism and fermentation process different from those disclosed in both the Ciegler patent and appellant's application. The examiner observed that in Hoffmann's examples, it appears that:

[W]ithin an optimum range their [sic] exists areas where a greater amount of precursor will produce smaller yields of the vitamin than a lesser amount of precursor while at other subsequent ranges a greater amount will produce larger yields of the vitamin.

The board stated that the examiner cited Hoffmann "purely for the purpose of argument to show the existence of anomaly in fermentation processes," and indeed, the examiner did use Hoffmann in that manner, concluding that from the knowledge of "this erratic behavior of microorganisms, it would be obvious to try the claimed amounts of citrus molasses in the Ciegler et al. process."

The board sustained the rejection based on the Ciegler patent and Hoffmann agreeing with the examiner that the determination of optimum amounts of citrus molasses would have been obvious even though outside the range taught by the Ciegler patent.

Like the Ciegler patent, the Fulde patent is directed to the synthesis of beta-carotene through the fermentation of *Blakeslea trispora*, and the use of a variety of citrus peel materials, including citrus meal and citrus molasses, in the fermentation medium is disclosed. Although no suitable citrus molasses concentration is specified, the examples in Fulde utilize citrus *meal* levels of 4%, 18% and 25%. The examiner reasoned, and the board agreed, that in view of Fulde's teaching of equivalence between citrus molasses and citrus meal, the substitution of citrus molasses for citrus meal *at the citrus meal concentrations* utilized in the examples, would have been obvious to one of ordinary skill in the art. The Ciegler patent, in both the examiner's and board's view, reinforced the conclusion of obviousness.

It was appellant's position during prosecution of his application in the Patent Office, and in his position before this court, that the use of citrus molasses at levels of 7-1/2% and above is not suggested by the prior art and unexpectedly leads to higher yields of beta-carotene. Appellant contends that one of ordinary skill in the art would have been turned away from the use of greater than 5% citrus molasses. In support of that contention, appellant submitted a publication of Ciegler, Nelson and Hall ⁵(hereinafter the Ciegler publication), the three patentees of the Ciegler patent, which reports experimentation with various citrus materials. Based on data presented in the publication, the authors concluded that:

Citrus molasses enhanced carotenogen

Page 95

esis at concentrations from 0.1% to 1.0%; at higher concentrations there was no further yield increase
* * *

Appellant additionally provided the affidavits of Joseph Grady, a bacteriologist, and Harold Koepsell, a biochemist. The Grady affidavit states that the data presented in Table II of the Ciegler patent, reproduced supra, suggests to affiant that the optimum citrus molasses level falls somewhere below 5% and that affiant would be discouraged from investigating concentrations higher than 5%. Moreover, Grady averred that Fulde teaches nothing with respect to citrus *molasses* concentration and that the Ciegler patent, rather than Fulde, would be the guiding prior art disclosure for one of ordinary skill in the relevant art. The Koepsell affidavit states that Ciegler, Nelson and Hall are highly respected in the fermentation arts, that their indication that at levels of citrus molasses higher than 5% no further beta-carotene yield increase could be expected would dissuade those skilled in the art from experimenting with such higher levels, and that with respect to the alleged equivalency between citrus meal and citrus molasses taught, in the examiner's view, in Fulde, "citrus meal has never been equated with citrus molasses in terms of concentration and b-carotene yield."

Opinion

[1] We do not think that the use of citrus molasses at concentrations higher than 5% would have been obvious from the Ciegler patent. While not expressly contrary, the Ciegler patent tends to teach away from such concentrations in its disclosure of a lower yield of beta-carotene at 5% than at 2.5%. That trend is underscored when the citrus meal results are considered. There, the increase in concentration of the additive increases product yield as shown in the table reproduced supra. The Ciegler publication and the Grady and Koepsell affidavits provide additional evidence that the impression to be drawn from the Ciegler patent is that citrus molasses values greater than 5% would not be expected to be advantageous. Ciegler, Nelson and Hall flatly state this in their publication, and we regard the opinions of experts in the field as entitled to consideration. In re Fay, 52 CCPA 1483, 1489-90, 347 F.2d 597, 603, 146 USPQ 47, 51 (1965).

[2] The board was convinced that one of ordinary skill in the art would experiment to determine optimum levels of citrus molasses concentration, especially where a commercial process rather than a laboratory-scale operation would be sought. However, while it may ordinarily be the case that the determination of optimum values for the parameters of a prior art process would be at least *prima facie* obvious, that conclusion depends upon what the prior art discloses with respect to those parameters. Where, as here, the prior art disclosure suggests the outer limits of the range of suitable values, and that the optimum resides within that range, and where there are indications elsewhere that in fact the optimum should be sought within that range, the determination of optimum values outside that range may not be obvious. We think it is not on the facts of this case.

The board also relied on the fact that in the Ciegler patent only two values, other than the control, are reported and concluded that one would not consider such a limited amount of testing to be adequate. Whatever may be said of the statistical significance of two points, the fact remains that this is all that the Ciegler patent reports, and if there is evidence tending to weaken the inference to be drawn from that data, we cannot find it in the record. The examiner supplied Hoffmann to establish the unpredictability of optimum values of process parameters in the fermentation arts, and the board apparently felt that, to some extent, the existence of anomaly would suggest further experimentation to determine optimum values. However, we think that logic and reason compel the conclusion that in an area of technology shown to be highly unpredictable in process values, the discovery of optimum values not in any way suggested by the prior art is more likely to be *unobvious* than obvious within the meaning of § 103. In establishing the unpredictability of the art relevant to the subject matter on appeal, the record strengthens appellant's claim that the realization that use of citrus molasses concentrations outside of anything taught or suggested by the Ciegler patent to increase beta-carotene yields is indeed unexpected.

The rejection of claims 1-3 under 35 U.S.C. 103 over the Ciegler patent in view of Hoffmann is accordingly reversed. We likewise reverse the rejection of those claims under § 103 over Fulde alone or in view of the Ciegler patent. As noted above, the examiner reasoned that Fulde renders obvious the use of citrus molasses at citrus meal concentrations which are disclosed to be higher than 7-1/2%. However, there is no suggestion in Fulde of using the molasses at the same concentration levels as the meal, and as is evident from the tables in the Ciegler patent, citrus meal and citrus molasses behave differently in terms of beta-carotene production. At most, Fulde teaches nothing with respect to suitable citrus molasses levels, and when we view the Fulde and Ciegler patents in conjunction with the Ciegler publication, we are convinced that the substitution of citrus molasses for citrus meal in the

Page 96

Fulde process at the citrus meal concentrations would not have been obvious to one of ordinary skill in the art.

Having weighed the strength of the evidence of obviousness against the evidence of nonobviousness provided by appellant, we conclude that none of the examiner's rejections are sustainable in this case and that the claimed subject matter on appeal would not have been obvious to one of ordinary skill in the art at the time the invention was made within the meaning of 35 U.S.C. 103. The decision of the board is therefore *reversed*.

Footnotes

Footnote 1. Serial No. 339,331 filed January 22, 1964.

Footnote 2. U. S. Patent No. 3,079,380 issued February 26, 1963.

Footnote 3. U. S. Patent No. 3,013,948 issued December 19, 1961.

Footnote 4. U. S. Patent No. 3,291,701 issued December 13, 1966, on an application filed July 6, 1962.

Footnote 5. Ciegler et al., Enhancement of b-Carotene Synthesis by Citrus Products, 11 Applied Microbiology 128-31 (1963).

- End of Case -

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